

### Problem Set 6: Quantifying Chemical Compounds

- 1) How many grams of carbon are in 10 g of caffeine ( $C_8H_{10}N_4O_2$ )?
- 2) How many chlorine atoms are in a 25 g sample of nickel (II) chloride hexahydrate? ( $NiCl_2 \cdot 6H_2O$ ).
- 3) A recent volcanic eruption yields a pungent toxic gas, analysis of a 2.30 g sample shows that it is 50.09 % sulfur and 49.91% oxygen? What is the empirical formula of the compound?
- 4) During photosynthesis plants make glucose from carbon dioxide and sunlight. The empirical formula of glucose is  $CH_2O$ . What is the molecular formula of glucose given the molar mass of glucose is 180.16 g/mol.
- 5a) Arrange in order of increasing radius. K, He, Cs, W, O.
- 5b) Arrange in order of increasing electronegativity. S, Cl, Ni, K, Li, C.
- 5c) Arrange in order of increasing size.  $F^-$ ,  $Na^+$ ,  $Br^-$ ,  $Al^{3+}$ , Mg,  $K^+$ .
- 5d) Arrange in order of increasing ionization energy. P, Ge, Fr, He, K.